

WHAT IS THE MONTANA DIABETES PROJECT AND HOW CAN WE BE CONTACTED:

The Montana Diabetes Project is funded through a cooperative agreement with the Centers for Disease Control and Prevention, Division of Diabetes Translation (U32/CCU815663-03). The mission of the Diabetes Project is to reduce the burden of diabetes and its complications among Montanans. Our web page can be accessed at <http://ahec.msu.montana.edu/diabetes/default.htm>.

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MONTANA DIABETES SURVEILLANCE & CLINICAL COMMUNICATION



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THE RISE IN OVERWEIGHT AND OBESITY AMONG MONTANANS, 1988-1993 TO 1994-1999.

BACKGROUND:

Overweight and obesity are major concerns for individuals, health care providers, and health agencies. Obesity and overweight are associated with a plethora of serious medical problems including cardiovascular disease, type 2 diabetes, hypercholesterolemia, gall bladder disease, osteoarthritis of the knee, and endometrial cancer in women.¹ Recently it was estimated that obesity cost U.S. business \$12.7 billion dollars in 1994.² Obesity is an independent risk factor for coronary heart disease, and it also aggravates other risk factors such as hypertension and hyperlipidemia and can lead to congestive heart failure.³

Hypertension is three times more common in obese persons when compared to normal weight individuals. Risk for type 2 diabetes increases with increasing body weight and central body fat.⁴ Type 2 diabetes, in turn, is also a major risk factor for heart disease.⁵ An increasing number of Americans and Montanans have reported being diagnosed with diabetes on the Behavioral Risk Factor Surveillance System (BRFSS) during the 1990's⁶⁻⁷ and this trend has been accompanied by increasing rates of obesity in the U.S. population.⁸⁻⁹ This surveillance report describes trends in overweight and obesity among adult Montanans from 1988 to 1999 through the BRFSS.

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Exciting results from Finland highlight weight control.

Key Findings and Implications:

- ◆ The prevalence of overweight and obesity among Montana adults increased by 7 and 4 percentage points, respectively, over the past 12 years, a relative increase of 16% for overweight and 40% for obesity.
- ◆ Increases were found across all sex, age and race groups.
- ◆ This represents an 11-pound average increase in 12 years.
- ◆ The rise in overweight and obesity will likely lead to increases in diabetes, heart disease and other chronic conditions.

METHODS:

The Montana DPHHS has conducted the BRFSS telephone survey of adult Montanans

aged ≥ 18 years since 1984. The survey questions include demographic information, behavioral risk factors, disease status, and health care utilization. To assess the prevalence of overweight and obesity among adult Montanans, each respondent is asked to report their height and weight. A body mass index (BMI) was calculated for respondents based on their self-reported height and weight. Those respondents whose BMI was $\geq 25.0 \text{ kg/m}^2$ were classified as overweight and those with a BMI $\geq 30.0 \text{ kg/m}^2$ were classified as obese.

Crude, unweighted prevalence estimates for overweight and obesity were calculated and compared by year and for the two 6-year time periods, 1988 to 1993 and 1994 to 1999. Prevalence estimates were also calculated stratifying by age, sex and race. Multivariate logistic regression analyses were performed to identify factors independently associated with overweight and obesity.

Table 1. Characteristics of BRFSS respondents and prevalence of overweight and obesity, Montana 1988-1993 and 1994-1999.

	1988-1993 (n=7,124) # (%)		1994-1999 (n=9,591) # (%)	
SEX				
Male	3,016	(42)	4,086	(43)
female	4,108	(58)	5,505	(57)
AGE (YEARS)				
18-29	1227	(17)	1560	(16)
30-44	2472	(35)	3100	(32)
45-64	1886	(26)	2867	(30)
≥65	1548	(22)	2054	(21)*
AMERICAN INDIAN OR RACE OTHER THAN WHITE				
Yes	375	(5)	561	(6)
No	6,749	(95)	9,030	(94)
OVERWEIGHT^				
Yes	2,998	(43)	4,520	(50)*
No	3,940	(57)	4,526	(50)
OBESE^^				
Yes	688	(10)	1,280	(14)*
No	6,250	(90)	7,792	(86)

*P ≤ 0.05

[^]Body mass index $\geq 25.0 \text{ kg/m}^2$

^{^^}Body mass index $\geq 30.0 \text{ kg/m}^2$

Figure 1. Mean body mass index among BRFSS respondents, by year, Montana, 1988-1999.

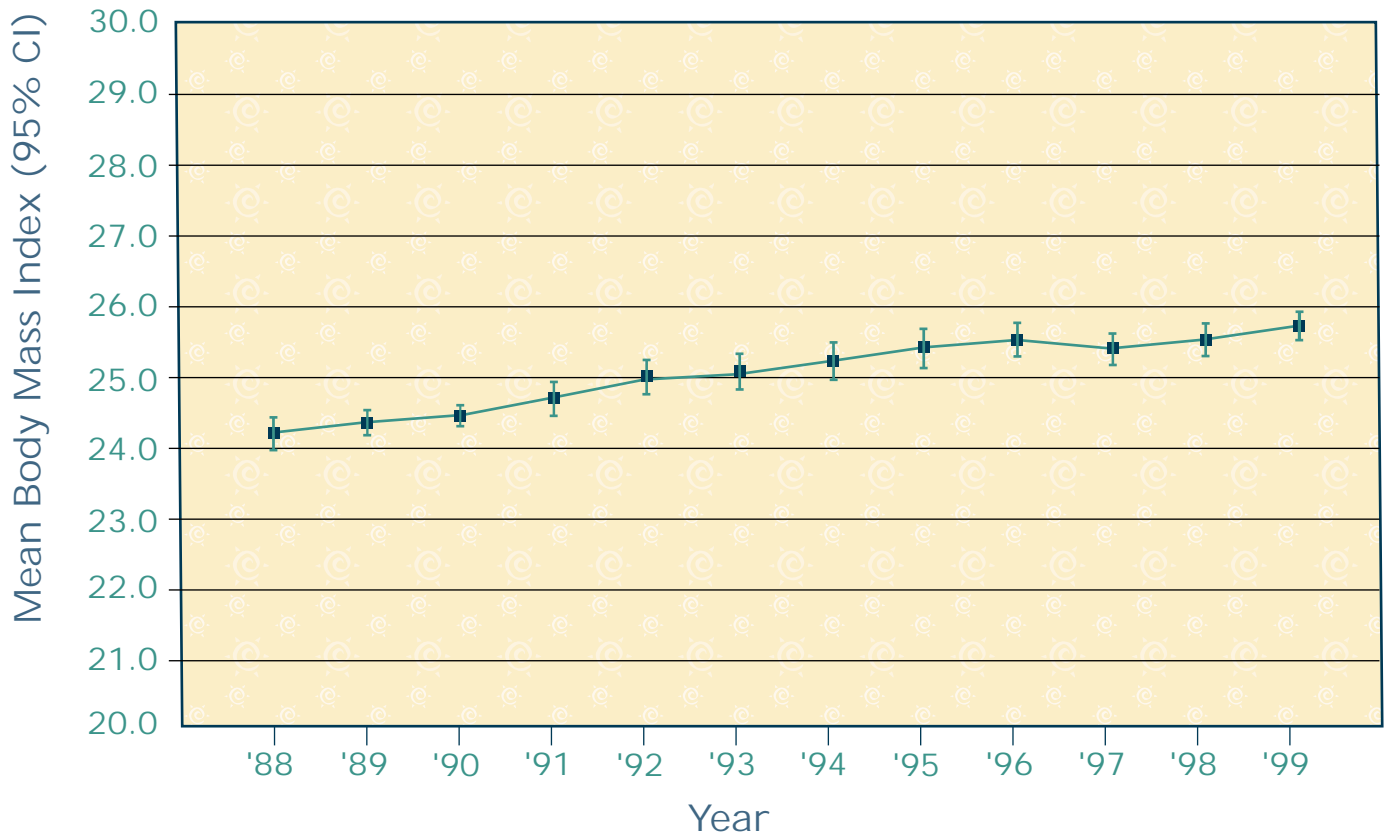
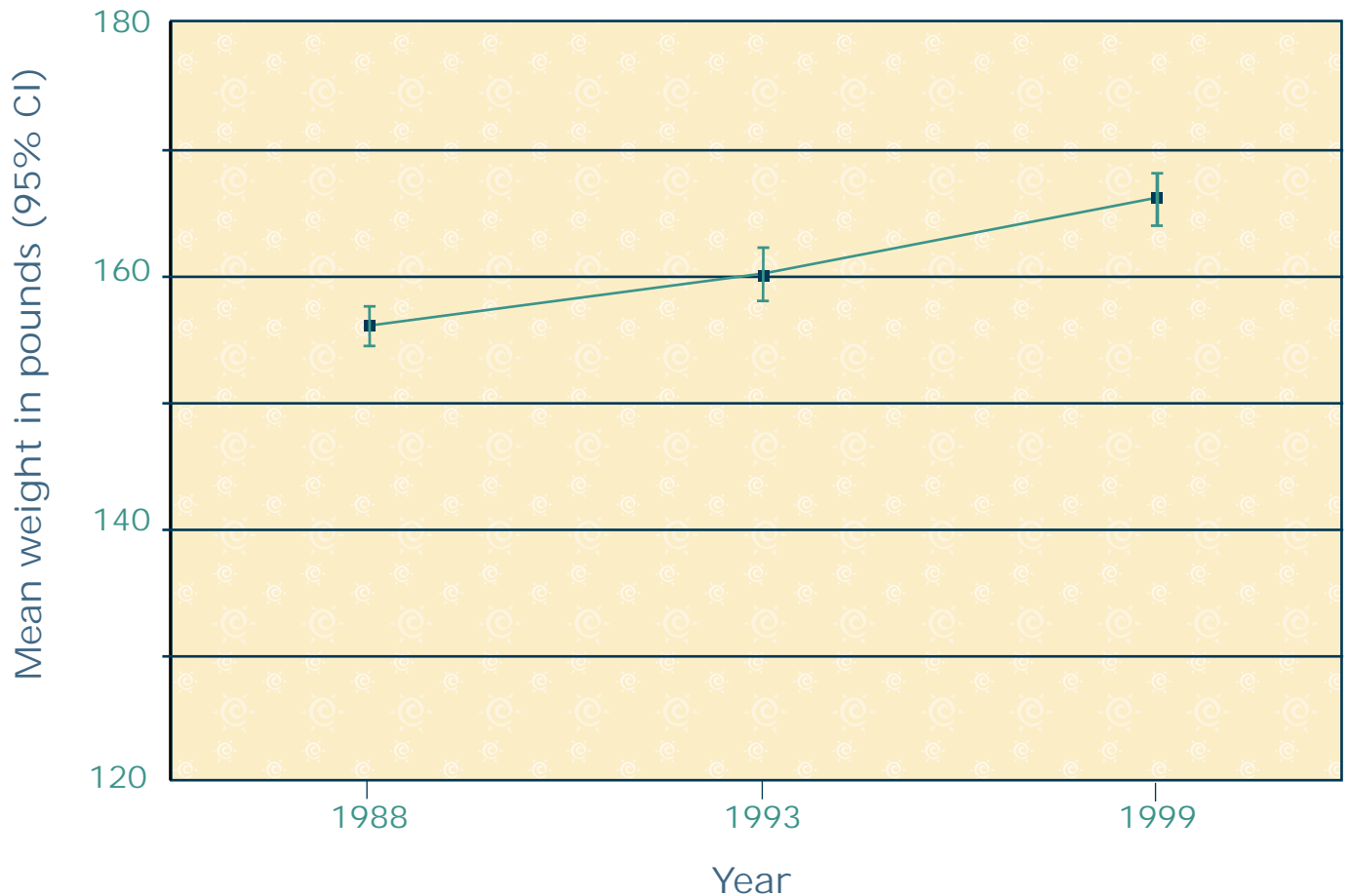


Figure 2. Mean weight (pounds) among BRFSS respondents, by year, Montana, 1988, 1993, and 1999.



CHARACTERISTICS OF MONTANA BRFSS RESPONDENTS, 1988-'93 AND 1994-'99:

The majority of respondents from both time periods were women and were white (Table 1). There were no differences in the sex or race distributions of respondents in these two time periods. Those surveyed from 1994-'99 were slightly older compared to respondents from the 1988-'93 surveys.

PREVALENCE OF OVERWEIGHT AND OBESITY:

Between 1988-'93 and 1994-'99, the prevalence of overweight increased by 7 percent-

age points and obesity by 4 percentage points (Table 1). Between 1994-1999, half (50%) of the respondents were overweight and 14% were obese. Figure 1 displays the mean BMI for respondents by year. The mean BMI in 1988 was 24.3; this increased to 25.0 in 1993 and 25.7 in 1999 (an overall increase in the mean BMI of 1.4 between 1988 and 1999). The mean weight increased from 156 pounds in 1988, to 160 pounds in 1993 and to 167 pounds in 1999 (Figure 2) — an increase of 11 pounds over the 12-year period. The prevalence of overweight and obesity between 1988-'93 and 1994-'99 increased significantly among men and women, in each age category, and for American Indian and non-Indian adults. □

Table 2. Overweight and obesity among BRFSS respondents by sex, age and race, Montana 1988-1993 and 1994-1999.

	Percent overweight [^]		Percent obese ^{^^}	
	1988-1993	1994-1999	1988-1993	1994-1999
SEX				
Male	53	61*	9	15*
Female	36	42*	11	14*
AGE (YEARS)				
≤65	45	51*	10	13*
45-64	53	59*	13	18*
30-44	42	48*	10	14*
18-29	29	36*	6	9*
AMERICAN INDIAN OR RACE OTHER THAN WHITE				
Yes	49	61*	13	21*
No	43	49*	10	14*

*P ≤ 0.05

[^]Body mass index ≥ 25.0 kg/m².

^{^^}Body mass index ≥ 30.0 kg/m².

Based on logistic regression analyses, multiple factors were associated with respondents being overweight (Table 3). Men, older adults, American Indians and respondents from 1994-'99 were more likely to be overweight compared to women, adults aged

18-29 years, white respondents, and respondents from 1988-'93. Similarly, multiple factors were associated with obesity including older age, American Indians, and respondents from 1994-'99.

Table 3. Factors independently associated with overweight and obesity among BRFSS respondents, Montana, 1988-1999.

	Overweight [^] OR (95% CI)	Obese ^{^^} OR (95% CI)*
SEX		
Male	2.20 (2.06-2.35)	1.01 (.91-1.11)
AMERICAN INDIAN OR RACE OTHER THAN WHITE		
	1.66 (1.44-1.91)	1.71 (1.43-2.05)
AGE (YEARS)		
>65	2.22 (1.99-2.47)	1.63 (1.37-1.95)
45-64	2.79 (2.52-3.09)	2.35 (1.99-2.76)
30-44	1.79- (1.63-1.98)	1.66 (1.41-1.96)
TIME PERIOD		
(1994-1999)	1.31 (1.23-1.0)	1.47 (1.33-1.620)

Referent groups: sex (male vs. female), American Indian or race other than white (vs. white),

Age groups (vs. age 18-29 years), time period 1994-1999 (vs. 1988-1993).

*Odds ratio (ninety-five percent confidence interval)

[^]Body mass index ≥ 25.0 kg/m².

^{^^}Body mass index ≥ 30.0 kg/m².

LIMITATIONS:

There are a number of limitations to consider when interpreting these findings.

Information regarding weight and height were self-reported and may be affected by recall bias or responses given to be socially desirable. Previous studies have found that self-reported weight tends to be under-reported.¹⁰ The prevalence of overweight and obesity is likely to be underestimated in that adult Montanans without telephones are not included in the survey. These persons are likely to be of lower socio-economic status, which is associated with higher prevalence rates of obesity.¹¹

CONCLUSIONS:

From the 1988 to 1993 time period to the 1994 to 1999 time period, the prevalence of overweight and obesity increased 16% and 40%, respectively, among adult Montanans. Increases were found in both sexes, all age groups and among white and American Indians. Our findings are similar to those from recent national studies, which found similar increases in the overweight and obesity nationally.⁸⁻⁹ Based on the 1988-'93

and 1994-'99 prevalence estimates and the 1990 adult census population (690,904 persons aged ≥ 18 years), the total number of Montana adults who are overweight has increased from about 297,000 to more than 345,400. The total number of Montana adults who are obese has increased from about 69,000 to more than 96,700.

The increase in overweight and obesity in Montana is an important public health and clinical issue. The prevalence of obesity is likely to continue to increase in the years ahead and, as a result the prevalence of type 2 diabetes, heart disease and other associated conditions are also likely to increase. In response to this epidemic, the Montana DPHHS will establish an Obesity Prevention Program through a cooperative agreement with the Centers for Disease Control and Prevention. The goal of this program will be to develop a comprehensive state plan to address this epidemic and identify interventions to reduce and prevent weight gain among Montanans. For more information about the Montana DPHHS Obesity Prevention Program please contact Lynda Blades at 406-444-7324 (lblades@state.mt.us).

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ANNUAL DIABETES CONFERENCE — SAVE THE DATE!

The annual diabetes conference will be held on Friday and Saturday, October 19-20, 2001 at the Holiday Inn Parkside in Missoula. The 19th will include an evening presentation and the 20th will include day-long presentations addressing the following:

- ◆ Integrated approaches to clinical management for cardiovascular disease and diabetes
- ◆ Management of hyperglycemia in type 1 and 2 diabetes
- ◆ Hypertension and special considerations for diabetes patients

Faculty include: Dr. Kevin O'Brien, Division of Cardiology, University of Washington and Drs. Edward Horton and Robert Stanton, Joslin Diabetes Center. CME, pharmacy, nursing and dietitian continuing education credits will be offered. For more information please contact Susan Day at 406-444-6677 (sday@state.mt.us).

EXCITING RESULTS FROM FINLAND HIGHLIGHT WEIGHT CONTROL

While Montanans were adding pounds, investigators in Finland were demonstrating that weight loss and physical activity can have health benefits. Overweight adults (mean age 55 years) with impaired glucose tolerance were randomized to either an intervention (individualized counseling aimed at reducing weight, total intake of fat, and intake of saturated fat and increasing intake of fiber and physical activity) or control group. Oral glucose-tolerance test was performed annually to determine a diagnosis of diabetes. The mean duration of follow-up was 3.2 years. The results are summarized below:

- ◆ The net weight loss by the end of year 2 was 3.5+/-5.5 kg in the intervention group and 0.8+/-4.4 kg in the control group ($P<0.001$).
- ◆ The cumulative incidence of diabetes after four years was 11 percent (95% CI 6-15%) in the intervention group and 23 percent (95% CI 17-29%) in the control group.
- ◆ During the trial, the risk of diabetes was reduced by 58 percent ($P<0.001$) in the intervention group.

The authors concluded that the reduction in the incidence of diabetes was directly associated with changes in lifestyle and that Type 2 diabetes can be prevented by changes in the lifestyles of high-risk subjects.

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